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Frequency of consumption and nutrient composition of composite dishes commonly consumed in the UK by South Asian Muslims originating from Bangladesh, Pakistan and East Africa (Ismailis)

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Abstract

Introduction This paper presents information on the nutrient composition of commonly consumed traditional dishes eaten by the three major South Asian Muslim groups residing in Britain, namely Bangladeshi, Pakistani and East African Ismaili Muslims.

Methods Information regarding the most common dishes consumed by South Asian Muslims originating from Bangladesh, Pakistan and East Africa (Ismailis) and living in London was obtained from 7-day menu records over two seasons. For each common dish, weighed recipes were collected in triplicate and the composition (energy and selected nutrients) was calculated from the ingredients and cooked weight of the dish.

Results The three Muslim groups showed considerable variation in traditional foods commonly consumed as well as variation in fat and energy contents of similar recipes both within and between groups. Nutrient composition of commonly consumed dishes is presented calculated from the recipe nearest the average in terms of fat and energy for a particular dish.

Discussion and conclusions The potential uses of the data, one of which would be to improve dietary compliance (especially to lower fat intakes) amongst the three diverse South Asian Muslim groups, are discussed.

Introduction

The UK census in 1991 was the first to identify the ethnic origin of respondents. It revealed that members of ethnic minority groups formed 5.7% of the population, just over 3 million of a total British population of 56 million (Owen, 1994; CSO, 1996). Minority groups from India, Pakistan and Bangladesh (South Asians) made up the largest nonwhite population, numbering 1.57 million

(49%), 3% of the population of Britain. South Asians are often seen to represent a homogeneous group of people sharing a common culture and hence common foodways. However, they represent a wide diversity in origin, language, religion and foodways.

Mortality from coronary heart disease (CHD) amongst peoples of South Asian origin is 40–50% higher than among the rest of the population of England and Wales (McKeigue & Marmot, 1988;

Williams, 1995). The pattern in the UK is consistent with observations of South Asian migrants in other countries (McKeigue *et al.*, 1989b). The prevalence of non-insulin-dependent diabetes mellitus (NIDDM) has been shown to be five times higher in South Asians than the general population (Mather & Keen, 1985). Diabetes and insulin resistance are risk factors for CHD and insulin resistance is strongly associated with obesity, particularly central obesity, which has been shown to be more common amongst South Asians than Europeans (McKeigue *et al.*, 1991; Bose, 1995). It has been suggested by some authors that this is paradoxical as the 'Asian' diet is lower in fat and higher in dietary fibre than the average UK diet (McKeigue *et al.*, 1985, 1989a; Smith *et al.*, 1993). However, as others working in the areas of nutritional epidemiology amongst South Asian minority groups in Britain have pointed out, there is a fundamental lack of information concerning the nutritional composition of cooked foods and eating habits of the different South Asian groups (Wharton *et al.*, 1984; McKeigue *et al.*, 1985; Stockley, 1988; Smith *et al.*, 1993). Changes in diet and greater physical activity have been proposed as important measures in prevention and management of CHD and NIDDM, with McKeigue & Sevak (1994) suggesting that lowering the amount of fat used in South Asian cooking might be the most effective measure. However, in order to identify dietary modifications to reduce fat and energy intakes to control obesity in these communities it is essential to have sound knowledge of what different South Asian groups are eating and until recently this information has been lacking.

We have previously reported data on the frequency of consumption and nutrient composition of composite dishes consumed by the Indian groups originating from Gujerat and the Punjab (Kassam-Khamis *et al.*, 1995, 1996). This paper therefore focuses on the diets of three South Asian Muslim groups residing in Britain, namely Bangladeshi, Pakistani and East African Ismaili Muslims. Most Bangladeshis in Britain originate from the Sylhet district of Bangladesh with the largest community in Britain being located in the borough of Tower Hamlets in the East End of London. They are the most recent migrants, having come to

Britain after the 1971 East/West Pakistan war and have been reported to be of lower socio-economic status than other South Asian communities (CSO, 1996). Pakistanis in Britain originate from three main areas in Pakistan, Mirpur in Azad Kashmir, Punjab and North West Frontier Province (NWFP), with Mirpuris forming the largest Pakistani community in Britain. Most Pakistanis arrived in the late 1950s and early 1960s to work in textile and engineering industries and their homes are evenly distributed among the metropolitan counties (Owen, 1994). East African Ismailis are *Shia* Muslims unlike the other two groups where the majority are *Sunni* Muslims. They migrated as refugees from Uganda, Tanzania and Kenya, having already migrated from India (Gujerat and Kutch) to Africa during the 1920s to 1940s to work on the railways, and later entered commerce and the professions. Like the Bangladeshis the majority live in London, but are not concentrated in any single Borough.

The present study therefore aimed to identify the traditional dishes most commonly eaten by South Asian Muslims originating from Bangladesh (B), Pakistan (P) and East Africa (Ismailis, I), to obtain recipes for these and provide information on the nutrient content of a range of dishes.

Methods

Recruitment of all three groups was confined to the greater London area, as shown in Table 1. Methods of recruitment varied somewhat between the groups and were designed to overcome problems such as illiteracy which might have resulted in a biased response from some groups.

Areas in London with a high concentration of residents of Bangladeshi origin were identified and the research worker (T.K.K.) went from door-to-door, with a Link worker, explaining the background to the study and potential benefits to the community of participation. A letter translated into Bengali was distributed to those in the family who were literate. Assuring the households that the study had no relation with the Local Authority or Home Office was important in gaining the confidence of the community and consent. Fifty households were approached and 30 (60%) agreed to participate.

Table 1 Sample recruitment area and method

| Group | Area | Method |
|-------------|----------------------------------|--|
| Bangladeshi | Tower Hamlets; Camden; Islington | Door to door with Link worker |
| Pakistani | Southall; East Acton; Ealing | Letters; telephone calls to random addresses from telephone directory |
| Ismaili | London | Letters; telephone calls to random addresses from Ismaili National Council |

The Pakistani sample was recruited by means of letters, explaining the study and potential benefits, sent at random to 160 households identified by surname from the West London telephone directory. Similar letters were sent to 120 Ismaili households whose addresses were taken at random from a list provided by the Ismaili National Council. A consent form was attached to these letters to be completed by the head of household if the family was willing to participate in the study. A stamped-addressed envelope was enclosed for reply. Letters were followed up by a telephone call to clarify the details of the study if no reply was received. In this way 31 Pakistani households and 31 Ismaili households were recruited.

All members of each household aged over 12 years kept a 7-day menu record in the winter (October–March) and summer (April–September) noting all foods and drinks consumed (without quantity), time of consumption and source of food (i.e. purchased vs. home-made). Where subjects could not read or write (9%) repeat 24-h recalls were conducted by one of the authors (T.K.K.). A total of 291 (B = 100, P = 108, I = 83) subjects from 92 households participated in the study. There were no significant differences according to generation or gender between the Muslim subgroups. Of the 92 households who provided 7-day menu records in winter, a total of 13 (14%) households did not continue to provide records in the summer. Five families had moved away and a further eight households declined to take any further part in the study. The reasons given were, travel abroad (three), family crises (three) and lack of time (two).

The most commonly consumed traditional dishes, defined as 'those consumed by one or more persons in at least 20% of households, within a group, once or more during the recorded period' were identified from the menu records. Using these

records, households were approached for collection of recipes selected and the food preparer asked to take part in the second part of the study. This involved the collection of precise weighed recipes for the commonly consumed traditional dishes. Recipes for each dish were collected from three different households within each Asian group. Each of the main food preparers was trained to use a scale (Soehnle 0–2500 × 2 g; 2500–5000 × 5 g) to weigh out the recipes accurately and provided with a recipe booklet to write down weights of ingredients and the final cooked weight for each dish. The scales were left in the household for a 1-month period in which 3–4 named common traditional dishes were weighed. Where subjects were illiterate the researcher (T.K.K.) observed the preparation and cooking and herself weighed the ingredients and final weight of the common traditional dishes. It was stressed that the dish should be cooked as normal and that the family, not the researcher, would be consuming the dish to minimize changes in recipes. Interpreters were present where necessary and all written material was translated into Bengali (Sylheti), Urdu and Gujarati.

In addition, as the Pakistani sample (from Southall, London) originated from a different area to the majority of Pakistanis living in Britain (Mirpuris), a sample of Mirpuris living outside London, in Bradford and Rochdale, were approached and a food frequency checklist of commonly consumed dishes eaten by Pakistanis in London was administered ($n = 17$). This checklist was also sent to the London sample and returned by 18 households. In this way the representativeness of the samples most commonly consumed traditional Pakistani dishes was checked.

Nutrient composition of recipes was calculated using the recipe function in COMPEAT (version

4.0, Lifeline UK). The nutrient data base was the 5th edition of *McCance and Widdowson's Food Composition Tables* and the available supplements to the *Composition of Foods* (Tan *et al.*, 1985; Holland *et al.*, 1988, 1989, 1991, 1992, 1993). The recipe ingredients were entered as raw foods and final cooked weight of the dish used to derive energy and nutrient content per 100 g. Where commonly consumed foods were not prepared at home but purchased from retail outlets (or in the case of some Ismaili dishes, from the local Mosque), samples were purchased from outlets mentioned by the subjects and were analysed directly in the laboratory according to standard AOAC (1975) procedures. The study was approved by King's College Research Ethics Committee.

Results

Commonly consumed dishes

Table 2 shows the variety of traditional dishes consumed by the three Muslim groups demonstrating that the Bangladeshis consumed the greatest variety of traditional dishes, followed by the Pakistanis and Ismailis.

Tables 3, 4 and 5 demonstrate that some seasonal variation was present, which appears partly to be due to seasonal availability, particularly with Bangladeshi imported fish and fresh spinach. Some foods such as 'khadhi' (a yogurt and chickpea soup) were viewed as warming foods and eaten more often in the winter season. Consumption of other foods such as fried snacks or sweetmeats appeared to be related to 'special occasions', e.g. timings of religious festivals rather than season *per se*. The Ismaili group were less likely to cook traditional foods but were seen to purchase more traditional 'common' dishes that were usually higher in fat.

Tables 3, 4 and 5 show that commonly consumed dishes were very group specific and different amongst the Muslim groups. Even staples differed, with Bangladeshis consuming mainly rice, Pakistanis consuming more 'roti' (unleavened bread similar to chappatti) and Ismailis eating either. Fish was an important part of the traditional diet for Bangladeshis only, whilst 'dhals' (pulses) were consumed by all groups but more varieties were consumed by the Pakistani group (channa, masoor, mung, urad). The Ismaili group commonly consumed fried snack foods ('thepla'; 'ganthia'). Ismailis in Britain originate from Gujarat and, as has been shown elsewhere (Kassam-Khamis *et al.*, 1995), fried snacks are also commonly consumed by Gujaratis. Fewer traditional vegetable dishes were commonly eaten by the Ismaili group, whereas Bangladeshis often had stir fried vegetables ('bhajis') or added vegetables to meat and chicken curries. Pakistanis tended to eat either vegetable curries on their own or with meat. Pakistanis commonly ate sweet dishes more than the other groups (kheer, sevia, mithai). Chewing of 'paan' (betel nut) was common only amongst Bangladeshis.

Table 6 shows that although there were some differences in the percentages of Pakistani subjects consuming certain dishes in Southall and Bradford (Mirpuri), the same types of dishes appeared on both lists, suggesting that the recipes would be representative of the Pakistani diet in general.

Nutrient composition

The data for the triplicate recipes collected showed variation within a group in fat content. Within the Bangladeshi and Pakistani groups, 60% of dishes had a variation of at least 5 g/100 g between the lowest and highest fat recipe. However, in the

| Group | Total summer dishes | Total winter dishes | Common summer dishes | Common winter dishes | Common summer bought dishes | Common winter bought dishes |
|-------------|---------------------|---------------------|----------------------|----------------------|-----------------------------|-----------------------------|
| Bangladeshi | 149 | 115 | 35 | 26 | 1 | 2 |
| Pakistani | 104 | 103 | 28 | 27 | 3 | 3 |
| Ismali | 119 | 105 | 20 | 15 | 6 | 3 |

Table 2 Variety of traditional dishes consumed by three Muslim groups of Bangladeshi, Pakistani and Ismaili origin. Numbers of different dishes made or purchased in summer or winter.

Table 3 Traditional dishes consumed by at least 20% of Bangladeshi households during the 7-day survey period.

| Name of dish | Percentage of households consuming | |
|-----------------------------------|------------------------------------|-----------------|
| | Summer (n = 30) | Winter (n = 25) |
| Rice | 100 | 100 |
| Chicken curry | 83 | 72 |
| Masoor dhal | 77 | 84 |
| Lamb curry | 70 | 68 |
| Potato bhaji (stir fry) | 57 | 64 |
| Paan | 53 | 52 |
| Mixed vegetable bhaji (stir fry) | 50 | 48 |
| Bual fish curry | 50 | 28 |
| Illish fish curry | 47 | 32 |
| Rui fish curry | 40 | 36 |
| Chapatti | 37 | 36 |
| Lamb and potato curry | 37 | (16) |
| Lamb keema curry (mince) | 30 | 32 |
| Chicken and potato curry | 30 | 24 |
| Lamb chops curry | 27 | (16) |
| Gargot/Ayr fish curry | 27 | 32 |
| Koi fish curry | 27 | 28 |
| Spinach bhaji (stir fry) | 27 | (16) |
| Ukni (meet pilau) | 23 | 28 |
| Prawn bhuna (dry curry) | 23 | 40 |
| Pabda fish curry | 23 | 32 |
| Shutki (dried) Gojar fish curry | 23 | (8) |
| Egg curry | 23 | 20 |
| Cauliflower bhaji (stir fry) | 23 | (16) |
| Rice pitta | 20 | 20 |
| Shandesh (fried sweet) | 20 | (0) |
| Chicken bhuna (dry curry) | 20 | 36 |
| Tengra fish curry | 20 | (16) |
| Ketchki fish curry | 20 | (16) |
| Magur fish curry | 20 | (12) |
| Baing/Bam and potato fish curry | 20 | (12) |
| Shutki (dried) Hidol fish chutney | 20 | (12) |
| Kebab (from outside) | 20 | 20 |
| Bhindi (okra) bhaji (stir fry) | 20 | (4) |
| Aubergine bhaji | 20 | (8) |
| Samosas (from outside) | (17) | 24 |
| Paratha | (10) | 20 |
| Sardines fish curry | (10) | 24 |
| Rui and potato fish curry | 7 | 24 |

N.B. () = dishes consumed by fewer than 20% of households in one season.

Ismaili group there was less variation in recipes from different households for the same dish. Only 37% of dishes had greater than 5 g/100 g variation in fat content. Table 7 shows the energy and

Table 4 Traditional dishes consumed by at least 20% of Pakistani households during the 7-day survey period

| Name of dish | Percentage of households consuming | |
|------------------------------------|------------------------------------|-----------------|
| | Summer (n = 30) | Winter (n = 25) |
| Roti/Chapatti | 90 | 93 |
| Channa Dhal | 87 | 70 |
| Chicken Curry | 77 | 81 |
| Rice | 71 | 67 |
| Lamp Curry | 52 | 59 |
| Mixed Vegetable Curry | 42 | 37 |
| Naan (from outside) | 45 | 55 |
| Meat Pilau | 23 | 22 |
| Vegetable Pilau | 48 | 36 |
| Palak (spinach) | 42 | (19) |
| Paratha | 39 | 30 |
| Aloo Gosht (lamb and potato) | 39 | 30 |
| Kebab | 39 | 52 |
| Keema Curry (minced lamb) | 35 | (19) |
| Gosht Palak (lamb and spinach) | 32 | 30 |
| Roast Chicken | 32 | 30 |
| Kofta Curry (meatballs) | 29 | 26 |
| Bhindi (okra) | 29 | 22 |
| Masoor Dhal | 26 | 48 |
| Sevia (sweet vermicelli) | 26 | 37 |
| Kheer (rice pudding) | 26 | 37 |
| Mithai (sweetmeats) (from outside) | 26 | (15) |
| Potato Curry | 26 | 33 |
| Aloo Keema (mince and potato) | 23 | (19) |
| Whole Channa Curry (chickpeas) | 23 | 30 |
| Mung Dhal | 23 | 37 |
| Pakora (bhajia) | 23 | (19) |
| Samosas (from outside) | 23 | 30 |
| Matar Keema (minced lamb and peas) | (16) | 22 |
| Dhal Maash | (10) | 22 |
| Biryani (from outside) | (3) | 37 |
| Khadi (yogurt curry) | (3) | 30 |

N.B. () = Dishes consumed by fewer than 20% of households in one season.

selected nutrient composition for the recipe which, of the three recipes collected for each dish, had intermediate values for energy and fat.

Of the 74 commonly consumed dishes analysed for nutrient composition across these three Muslim groups, only 11 dishes with similar names and ingredient lists were consumed by at least two of these groups and, as shown in Table 8, only six dishes were common to all three Muslim groups,

Table 5 Traditional dishes consumed by at least 20% of Ismaili households during the 7-day survey period.

| Name of dish | Percentage of households consuming | |
|--------------------------------------|------------------------------------|----------------------------|
| | Summer (<i>n</i> = 31) | Winter (<i>n</i> = 27) |
| Rice | 94 | 78 |
| Rotli/Chapatti | 77 | 63 |
| Ukni (meat pilau) | 58 | 22 |
| Chicken Curry | 52 | 59 |
| Meat curry | 45 | 30 |
| Samosas (from outside) | 45 | 37 |
| Bhajias (from outside) | 45 | 22 |
| Dar/Dhal | 39 | 44 |
| Mixed vegetable curry | 32 | 30 |
| Kebab (from outside) | 32 | 30 |
| Naan (from outside) | 29 | (19) |
| Biriyani (meat and rice) | 29 | (15) |
| Dhokra (steamed gram flour cake) | 29 | 26 |
| Thepla (fried sweet biscuit) | 29 | (15) |
| Paratha (from outside) | 26 | (15) |
| Ganthia (fried snack) (from outside) | 26 | (7) |
| Kitchadi (rice and lentils) | 26 | 33 |
| Keema curry (mince) | 23 | (19) |
| Masala fish and potatoes | 23 | (11) |
| Whole Mung curry | 23 | 22 |
| Chicken pilau | (19) | 25 |
| Khadhi (yogurt curry) | (13) | 26 |

N.B. () = dishes consumed by fewer than 20% of households in one season.

mainly meat and chicken curries, mixed vegetable curry and staples including meat pilau. A one-way analysis of variance, although not significant, showed a trend for the dishes made by the Ismaili subjects to have the lowest fat content for those dishes in common with other groups (mean = 8.1 g fat/100 g dish) with the Pakistani and Bangladeshi recipes higher in fat (mean = 12.6 g and 12.7 g fat/100 g dish, respectively).

Discussion

As previously noted with non-Muslim subjects originating from Punjab or Gujerat in India (Kassam-Khamis *et al.*, 1995), there was wide diversity in diets and in commonly consumed traditional foods even amongst South Asians

Table 6 Traditional dishes commonly consumed by at least 20% of Pakistani households at least once in 7 days, outside of London (Mirpuris) and within London (Non-Mirpuris) and compared to the original London Pakistani sample in the winter season.

| Name of dish | Percentage of households consuming | | |
|-----------------------|------------------------------------|------------------------------------|--|
| | Within London (<i>n</i> = 18) | Outside London (<i>n</i> = 17) | Original sample London (<i>n</i> = 27) |
| Roti | 85 | 94 | 93 |
| Naan | 83 | 25 | 55 |
| Rice | 78 | 58 | 67 |
| Channa dhal | 78 | 41 | 70 |
| Roast chicken | 78 | 41 | 30 |
| Aloo Keema | 77 | 35 | 19 |
| Masoor dhal | 74 | 60 | 48 |
| Gosht palak | 73 | 42 | 30 |
| Vegetable pilau | 73 | 41 | 37 |
| Palak (spinach) | 68 | 47 | 19 |
| Potato curry | 62 | 36 | 33 |
| Keema curry | 62 | 41 | 19 |
| Kofta curry | 57 | 42 | 26 |
| Aloo gosht | 55 | 41 | 30 |
| Shami Kebab | 55 | 36 | |
| Sheekh Kebab | 50 | 23 | 52 |
| Chicken curry | 50 | 42 | 81 |
| Paratha | 50 | 25 | 30 |
| Lamb curry | 50 | 89 | 59 |
| Mixed vegetable curry | 50 | 52 | 36 |
| Matar Keema | 45 | 35 | 22 |
| Bhindi (okra) | 45 | 59 | 22 |
| Meat Samosas | 44 | 35 | |
| Vegetable Samosas | 23 | 30 | 30 |
| Mithai (sweetmeats) | 44 | 30 | 15 |
| Meat pilau | 40 | 53 | 22 |
| Zarda (sweet rice) | 40 | 42 | 19 |
| Channa curry | 39 | 41 | 30 |
| Pakora (bhajia) | 39 | 29 | 19 |
| Kheer (rice pudding) | 38 | 47 | 37 |
| Dhal Maash | 35 | 30 | 22 |
| Biriyani | 33 | 30 | 37 |
| Mung dhal | 30 | 35 | 37 |
| Sevia (vermicelli) | 27 | 52 | 37 |
| Khadhi | 22 | (6) | 30 |

N.B. () = dishes consumed by fewer than 20% of Mirpuri households in one season.

sharing a common religion and hence common food laws and restrictions. This diversity has been noted by others (Hunt, 1977; Wharton *et al.*, 1984; Smith *et al.*, 1993) and emphasizes the need to take these differences into account when providing dietary advice to individuals or groups of South

Table 7 Nutrient composition of South Asian Muslim Dishes (per 100g). Median values from recipe supplied by three separate households.

| Recipe | Main ingredients | Water (g) | Protein (g) | Fat (g) | CHO (g) | Energy (kcal) | Energy (kJ) |
|--------------------------------|---|--------------|----------------|------------|------------|------------------|----------------|
| Vegetable dishes | | | | | | | |
| Ismaili mixed veg curry | new pots, fr mixed veg, onions, tomatoes, sunfl oil | 78.9 | 2.2 | 4.2 | 11.4 | 89 | 374 |
| Pakistani mixed veg curry | fr mixed veg., onions, tomatoes, sunfl oil | 83.7 | 2.8 | 1.5 | 7.5 | 51 | 217 |
| Bengali mixed veg bhaji | fr mixed veg, onions, new pots, veg oil, tomatoes | 63.5 | 2.5 | 19.7 | 11.2 | 229 | 947 |
| Pakistani spinach curry | spinach, butter ghee, onions, chilli, chick pea flour | 78.2 | 3.0 | 9.2 | 3.7 | 109 | 450 |
| Bengali spinach bhaji | spinach, onions, sunfl oil, coriander | 60.2 | 6.8 | 10.8 | 5.1 | 145 | 596 |
| Pakistani potato curry | new pots, tomatoes, onions, corn oil | 80.2 | 1.3 | 8.5 | 7.8 | 109 | 451 |
| Bengali potato bhaji | old pots, onions, green peppers, veg oil | 69.4 | 2.4 | 5.7 | 18.7 | 130 | 546 |
| Pakistani aloo pakora | chick pea flour, old pots, sunfl oil, onion, spinach | 35.2 | 10.3 | 16.3 | 28.8 | 293 | 1228 |
| Pakistani bhindi | okra, sunfl oil, onions, tomatoes | 81.7 | 1.7 | 7.2 | 4.5 | 86 | 357 |
| Pulse dishes | | | | | | | |
| Pakistani masoor dhal | split red lentils, butter ghee | 70.1 | 6.2 | 6.3 | 14.5 | 135 | 566 |
| Bengali masoor dhal | split red lentils, onions, corn oil | 79.7 | 4.0 | 2.8 | 9.7 | 77 | 325 |
| Pakistani channa dhal | chick peas, tomatoes, onions, butter ghee | 73.3 | 5.1 | 6.2 | 11.6 | 119 | 500 |
| Pakistani chick pea curry | chick peas whole, potatoes, atoms, corn oil | 69.0 | 4.4 | 9.3 | 12.9 | 149 | 623 |
| Pakistani mung dhal | mung beans, veg oil, onions | 76.7 | 5.3 | 5.1 | 9.2 | 101 | 421 |
| Ismaili whole mung curry | mung beans whole, onions, tomatoes, sunfl oil | 76.0 | 4.2 | 5.9 | 8.1 | 98 | 410 |
| Pakistani dhal maash | urad gram, onions, veg oil | 69.1 | 6.9 | 5.5 | 11.9 | 123 | 517 |
| Ismaili dhal/dar | pigeon peas, split red lentils, tomatoes, veg oil | 81.5 | 4.1 | 2.1 | 9.9 | 69 | 294 |
| Ismaili kadhi | low fat yogurt, onions, chick pea flour, veg oil | 87.7 | 2.6 | 3.1 | 4.4 | 49 | 206 |
| Pakistani kadhi | low fat yogurt, onions, corn oil, chick pea flour | 66.4 | 5.0 | 12.7 | 10.4 | 170 | 705 |
| Ismaili kitchadi | white rice, mung beans, veg margarine | 79.8 | 2.5 | 1.6 | 15.1 | 81 | 343 |
| Rice dishes | | | | | | | |
| Bengali meat pilau/ukni | basmati rice, onions, lamb, new pots, veg oil, butter | 54.5 | 4.5 | 13.6 | 25.6 | 244 | 1013 |
| Ismaili meat pilau/ukni | lamb, basmati rice, old pots, onions, saffl oil | 66.9 | 6.2 | 8.1 | 16.8 | 165 | 685 |
| Ismaili chicken pilau | chicken, basmati rice, onions, tomatoes, sunfl oil | 67.5 | 7.7 | 4.0 | 19.0 | 143 | 599 |
| Pakistani meat pilau | lamb breast, basmati rice, onions, corn oil | 55.3 | 7.0 | 16.1 | 20.0 | 253 | 1050 |
| Ismaili biryani | chicken, basmati rice, onions, tomatoes, yogurt | 57.8 | 12.8 | 4.5 | 22.7 | 183 | 766 |
| Pakistani vegetable pilau | basmati rice, peas, onions, veg oil | 54.9 | 4.3 | 3.0 | 35.4 | 187 | 782 |
| Ismaili rice | white rice, sunfl oil | 72.1 | 1.9 | 4.3 | 20.4 | 129 | 538 |
| Bengali rice pitta | rice flour | 74.9 | 1.8 | 0.2 | 22.6 | 103 | 432 |
| Other cereal dishes | | | | | | | |
| Pakistani paratha | white chapati flour, water, veg oil | 35.9 | 5.7 | 12.2 | 45.4 | 303 | 1274 |
| Bengali paratha | white chapati flour, water, butter ghee, veg oil | 35.6 | 4.6 | 23.1 | 36.0 | 361 | 1507 |
| Pakistani roti | brown chapati flour, water | 37.2 | 8.2 | 0.9 | 52.8 | 238 | 1016 |
| Ismaili rotli | brown chapati flour, water, sunfl oil | 24.1 | 8.6 | 10.9 | 55.2 | 339 | 1432 |
| Bengali chapati | white chapati flour, water | 36.4 | 7.1 | 0.4 | 56.1 | 242 | 1031 |
| Ismaili dokhra | buttermilk, semolina, sunfl oil, coriander leaves | 63.0 | 5.3 | 4.5 | 26.9 | 162 | 666 |
| Meat dishes | | | | | | | |
| Ismaili lamb curry | lamb, tomatoes, onions, veg oil | 75.0 | 12.3 | 8.8 | 1.8 | 133 | 556 |
| Pakistani lamb curry | lamb breast, tomatoes, onions, corn oil, yogurt | 59.7 | 9.1 | 25.9 | 2.6 | 276 | 1142 |
| Bengali lamb curry | lamb, onions, corn oil | 60.2 | 16.1 | 17.4 | 2.8 | 229 | 953 |
| Ismaili lamb keema | lamb mince, tomatoes, onions, tomato puree | 75.9 | 6.8 | 13.7 | 2.0 | 158 | 653 |
| Pakistani lamb keema | lamb mince, onions, sunfl oil, tomatoes | 60.0 | 6.3 | 26.8 | 3.2 | 275 | 1133 |
| Pakistani matar keema | lamb mince, onions, peas, tomatoes, veg ghee | 59.3 | 14.4 | 16.9 | 5.1 | 227 | 944 |
| Pakistani aloo keema | beef rice, old pots, onions, tomatoes | 60.7 | 11.4 | 15.9 | 9.1 | 222 | 923 |
| Bengali lamb keema | lamb mince, onions, veg oil | 51.3 | 12.3 | 29.1 | 3.1 | 320 | 1324 |
| Pakistani aloo gosht | lamb leg, onions, old pots, sunfl oil | 68.2 | 8.9 | 12.4 | 7.6 | 174 | 724 |
| Pakistani kofta | lamb mince, onions, sunfl oil, tomatoes | 60.0 | 10.2 | 24.3 | 2.5 | 268 | 1106 |
| Pakistani gosht palak | lamb leg, spinach, tomatoes, coriander seed | 75.1 | 9.5 | 9.4 | 2.0 | 126 | 523 |
| Ismaili chicken & potato curry | chicken, new pots, tomatoes, onions, corn oil | 78.0 | 10.1 | 5.3 | 4.5 | 104 | 435 |

continued

Table 7 *continued*

| Recipe | Main ingredients | Water (g) | Protein (g) | Fat (g) | CHO (g) | Energy (kcal) | Energy (kJ) |
|----------------------------|---|--------------|----------------|------------|------------|------------------|----------------|
| Ismaili chicken curry | chicken, tomatoes, onion, corn oil | 77.7 | 10.2 | 5.2 | 4.9 | 106 | 442 |
| Pakistani chicken curry | chicken, tomatoes, onions, corn oil | 69.3 | 8.7 | 15.7 | 2.6 | 181 | 751 |
| Bengali chicken curry | chicken, onions, veg oil, lemons | 67.6 | 15.1 | 10.5 | 2.6 | 163 | 679 |
| Bengali chicken bhuna | chicken, onions, sunfl oil, coriander | 64.5 | 19.5 | 10.3 | 2.0 | 174 | 726 |
| Bengali chicken & potato | chicken, old pots, tomatoes | 72.2 | 12.3 | 9.6 | 4.1 | 150 | 624 |
| Pakistani roast chicken | chicken, yogurt | 68.9 | 23.6 | 5.1 | 0.3 | 140 | 588 |
| Egg dishes | | | | | | | |
| Bengali egg curry | eggs, onions, corn oil | 55.0 | 10.5 | 23.9 | 5.7 | 275 | 1137 |
| Fish dishes | | | | | | | |
| Ismaili masala fish | | 67.1 | 8.7 | 8.4 | 11.3 | 150 | 627 |
| Bengali boal fish curry | boal fish, onions, corn oil | 71.9 | 8.9 | 8.8 | 2.0 | 120 | 500 |
| Bengali illish fish curry | hilsa (illish) fish, onions, veg oil | 58.3 | 14.0 | 20.4 | 1.5 | 243 | 1005 |
| Bengali gargot (ayr) curry | ayr fish, onions, veg oil | 79.5 | 7.8 | 7.7 | 0.7 | 101 | 419 |
| Bengali rui fish curry | rohu (rui) fish, onions, corn oil | 73.7 | 9.0 | 9.8 | 1.7 | 126 | 522 |
| Bengali prawn bhuna | prawns, tomatoes, onions, veg oil | 63.7 | 15.9 | 11.1 | 3.8 | 178 | 742 |
| Bengali rui fish & potato | rohu, old potatoes, onions, corn oil | 74.6 | 8.3 | 7.1 | 5.7 | 118 | 490 |
| Bengali sardines curry | sardines, onions, veg oil | 81.5 | 7.0 | 7.7 | 1.1 | 98 | 408 |
| Bengali pabda fish curry | pabda fish, onions, sunfl oil | 76.4 | 11.2 | 5.1 | 4.3 | 106 | 441 |
| Bengali magur fish curry | magur fish, onions, sunfl oil | 76.5 | 10.3 | 8.8 | 3.0 | 129 | 534 |
| Bengali koi fish curry | koi fish, onions, sunfl oil | 67.9 | 7.2 | 15.8 | 4.1 | 181 | 750 |
| Bengali baim fish & potato | gojar (baim) fish, old potatoes, onions, veg oil | 64.9 | 15.3 | 7.4 | 6.3 | 144 | 600 |
| Bengali hidol fish chutney | onions, dry hidol fish, veg oil | 62.8 | 7.3 | 14.6 | 6.2 | 168 | 698 |
| Bengali ketchki fish curry | ketchki fish, onions, veg oil | 68.3 | 11.1 | 8.7 | 4.9 | 134 | 557 |
| Bengali gojar shutki curry | onions, dry gojar fish, veg oil | 42.1 | 19.0 | 24.3 | 4.3 | 300 | 1241 |
| Sweet dishes | | | | | | | |
| Pakistani kheer | milk, white rice, sugar | 65.3 | 2.9 | 3.0 | 29.4 | 151 | 637 |
| Pakistani sevia | sugar, vermicelli, veg ghee, almonds, coconut | 54.6 | 3.7 | 10.8 | 30.0 | 226 | 945 |
| Pakistani zarda | basmati rice, sugar, sunfl oil, almonds | 29.0 | 4.5 | 9.9 | 56.0 | 330 | 1379 |
| Ismaili thepla | white flour, sunfl oil, sugar, eggs, semi-skim milk | 11.6 | 5.9 | 26.6 | 57.4 | 477 | 1997 |
| Bengali shandesh-sweet | white flour, corn oil, sugar | 41.3 | 3.9 | 16.2 | 40.0 | 311 | 1304 |

Table 7 *continued*

| | Starch (g) | Sugar (g) | NSP (g) | Na (mg) | K (mg) | Ca (mg) | Iron (mg) |
|---------------------------|---------------|--------------|------------|------------|-----------|------------|--------------|
| Vegetable dishes | | | | | | | |
| Ismaili mixed veg curry | 8.0 | 3.1 | 1.6 | 513 | 284 | 22 | 0.6 |
| Pakistani mixed veg curry | 2.2 | 4.3 | 2.5 | 428 | 176 | 36 | 0.9 |
| Bengali mixed veg bhaji | 6.4 | 3.9 | 3.0 | 281 | 227 | 27 | 0.6 |
| Pakistani spinach curry | 1.6 | 1.8 | 2.2 | 562 | 457 | 146 | 2.0 |
| Bengali spinach bhaji | 0.8 | 4.1 | 4.9 | 2203 | 1173 | 383 | 4.9 |
| Pakistani potato curry | 5.8 | 1.8 | 0.7 | 268 | 226 | 16 | 0.7 |
| Bengali potato bhaji | 16.7 | 1.6 | 1.6 | 616 | 402 | 11 | 0.6 |
| Pakistani aloo pakora | 25.1 | 1.9 | 5.6 | 347 | 631 | 104 | 4.5 |
| Pakistani bhindi | 0.2 | 3.5 | 2.2 | 273 | 245 | 77 | 0.8 |
| Pulse dishes | | | | | | | |
| Pakistani masoor dhal | 13.1 | 0.6 | 1.3 | 121 | 205 | 18 | 2.2 |
| Bengali masoor dhal | 8.3 | 0.8 | 0.9 | 503 | 142 | 12 | 1.4 |
| Pakistani channa dhal | 9.5 | 1.3 | 1.8 | 369 | 263 | 15 | 1.3 |

continued

Table 7 *continued*

| | Starch (g) | Sugar (g) | NSP (g) | Na (mg) | K (mg) | Ca (mg) | Iron (mg) |
|--------------------------------|---------------|--------------|------------|------------|-----------|------------|--------------|
| Pakistani chickpea curry | 10.3 | 1.8 | 2.3 | 332 | 283 | 34 | 1.8 |
| Pakistani mung dhal | 8.2 | 0.4 | 2.2 | 171 | 264 | 9 | 1.2 |
| Ismaili whole mung curry | 5.6 | 1.7 | 1.7 | 956 | 275 | 18 | 1.2 |
| Pakistani dhal maash | 10.0 | 1.0 | 2.3 | 17 | 276 | 50 | 1.9 |
| Ismaili dhal/dar | 8.8 | 0.7 | 0.8 | 151 | 238 | 16 | 1.1 |
| Ismaili kadhi | | | | 295 | 125 | 65 | 0.7 |
| Pakistani kadhi | 4.9 | 4.8 | 1.4 | 641 | 289 | 124 | 1.3 |
| Ismaili kitchadi | 14.7 | 0.1 | 0.6 | 374 | 91 | 3 | 0.4 |
| Rice dishes | | | | | | | |
| Bengali meat pilau/ukni | 24.5 | 0.8 | 0.4 | 342 | 91 | 12 | 0.7 |
| Ismaili meat pilau/ukni | 19.2 | 0.7 | 0.6 | 170 | 184 | 13 | 1.0 |
| Ismaili chicken pilau/ukni | 18.5 | 0.4 | 11.3 | 377 | 147 | 11 | 0.5 |
| Pakistani meat pilau | 19.5 | 0.5 | 0.3 | 265 | 103 | 15 | 1.0 |
| Ismaili biriyani | 20.8 | 1.6 | 0.5 | 128 | 263 | 27 | 1.0 |
| Pakistani vegetable pilau | 34.1 | 0.8 | 1.3 | 225 | 93 | 16 | 0.9 |
| Ismaili rice | 20.4 | 0.0 | 0.1 | 325 | 28 | 5 | 0.3 |
| Bengali rice pitta | 22.6 | 0.0 | 0.6 | 56 | 68 | 7 | 0.5 |
| Other cereal dishes | | | | | | | |
| Pakistani paratha | 44.2 | 1.2 | 1.9 | 273 | 117 | 49 | 1.5 |
| Bengali paratha | 35.1 | 1.0 | 1.4 | 285 | 93 | 39 | 1.2 |
| Pakistani roti | 50.5 | 2.3 | 4.5 | 28 | 200 | 62 | 2.4 |
| Ismaili rotli | 52.8 | 2.4 | 4.8 | 68 | 210 | 64 | 2.6 |
| Bengali chapati | 54.6 | 1.5 | 2.2 | 11 | 145 | 61 | 1.8 |
| Ismaili dokhra | 23.9 | 2.9 | 0.8 | 136 | 172 | 71 | 1.0 |
| Meat dishes | | | | | | | |
| Ismaili lamb curry | 0.5 | 1.0 | 0.4 | 268 | 284 | 16 | 1.4 |
| Pakistani lamb curry | 0.7 | 1.6 | 0.4 | 349 | 253 | 24 | 1.3 |
| Bengali lamb curry | 0.3 | 1.4 | 0.4 | 689 | 353 | 26 | 2.1 |
| Ismaili lamb keema | 0.3 | 1.6 | 0.4 | 121 | 237 | 13 | 0.8 |
| Pakistani lamb keema | 0.4 | 2.1 | 0.6 | 633 | 213 | 21 | 0.9 |
| Pakistani matar keema | 1.5 | 2.5 | 1.4 | 478 | 397 | 28 | 2.6 |
| Pakistani aloo keema | 7.0 | 1.7 | 1.1 | 231 | 389 | 18 | 1.9 |
| Bengali lamb keema | 0.5 | 1.5 | 0.6 | 928 | 286 | 36 | 2.6 |
| Pakistani aloo gosht | 4.2 | 2.0 | 0.8 | 404 | 372 | 34 | 1.4 |
| Pakistani kofta | 0.3 | 1.4 | 0.4 | 589 | 285 | 23 | 1.3 |
| Pakistani gosht palak | 0.1 | 1.5 | 0.9 | 320 | 325 | 67 | 1.8 |
| Ismaili chicken & potato curry | 3.5 | 0.9 | 0.4 | 341 | 276 | 14 | 0.9 |
| Ismaili chicken curry | 4.0 | 0.7 | 0.4 | 231 | 292 | 14 | 0.9 |
| Pakistani chicken curry | 0.6 | 1.7 | 0.4 | 531 | 268 | 27 | 1.3 |
| Bengali chicken curry | 0.3 | 1.5 | 0.6 | 460 | 316 | 34 | 1.8 |
| Bengali chicken bhuna | 0.2 | 1.1 | 0.4 | 384 | 411 | 34 | 1.8 |
| Bengali chicken & potato | 2.8 | 0.8 | 0.4 | 210 | 294 | 20 | 0.9 |
| Pakistani roast chicken | 0.1 | 0.2 | 0.0 | 343 | 387 | 18 | 0.9 |
| Egg dishes | | | | | | | |
| Bengali egg curry | 0.0 | 3.6 | 1.0 | 543 | 288 | 83 | 2.7 |
| Fish dishes | | | | | | | |
| Ismaili masala fish | 7.9 | 3.0 | 1.2 | 412 | 508 | 25 | 1.0 |
| Bengali boal fish curry | 0.1 | 1.4 | 0.4 | N | N | 59 | 1.1 |
| Bengali illish fish curry | 0.0 | 1.0 | 0.4 | 593 | 174 | 128 | 2.0 |
| Bengali gargot (ayr) curry | 0.0 | 0.5 | 0.1 | N | N | 187 | 0.7 |

continued

Table 7 *continued*

| | Starch (g) | Sugar (g) | NSP (g) | Na (mg) | K (mg) | Ca (mg) | Iron (mg) |
|----------------------------|---------------|--------------|------------|------------|-----------|------------|--------------|
| Bengali rui fish curry | 0.0 | 1.1 | 0.3 | 400 | 236 | N | 1.2 |
| Bengali prawn bhuna | 0.1 | 2.7 | 1.1 | 1053 | 297 | 98 | 2.3 |
| Bengali rui fish & potato | 4.7 | 0.7 | 0.5 | 350 | 272 | N | 0.7 |
| Bengali sardines curry | 0.2 | 0.7 | 0.2 | 172 | 15 | 36 | 0.9 |
| Bengali pabda fish curry | 0.1 | 1.2 | 0.4 | 547 | N | 187 | 1.3 |
| Bengali magur fish curry | 0.1 | 0.6 | 0.2 | 357 | N | 324 | 1.1 |
| Bengali koi fish curry | 0.1 | 1.1 | 0.3 | 466 | N | 206 | 1.7 |
| Bengali baim fish & potato | 4.1 | 0.8 | 0.6 | 1859 | N | 151 | 1.2 |
| Bengali hidol fish chutney | 0.0 | 4.4 | 1.1 | 1283 | N | 538 | 5.4 |
| Bengali ketchki fish curry | 0.2 | 1.8 | 1.9 | 537 | N | 432 | 5.3 |
| Bengali gojar shutki curry | 0.0 | 1.9 | 0.7 | 3037 | N | 02 | 2.1 |
| Sweet dishes | | | | | | | |
| Pakistani kheer | 5.0 | 24.4 | 0.0 | 43 | 115 | 90 | 0.1 |
| Pakistani sevia | 7.6 | 22.4 | 0.9 | 36 | 150 | 82 | 1.1 |
| Pakistani zarda | 42.8 | 13.2 | 0.4 | 4 | 79 | 16 | 1.0 |
| Ismaili thepla | 35.4 | 22.0 | 1.4 | 20 | 102 | 84 | 1.4 |
| Bengali shandesh-sweet | 31.8 | 8.3 | 1.3 | 1 | 63 | 58 | 0.8 |

N indicates that a significant amount of the nutrient is present but no value is available.

Asian origin in this country. Bangladeshi and Pakistani subjects were found to eat more traditional meals than the Ismaili group, who mostly ate traditional foods only at the main meal of the day (Kassam-Khamis *et al.*, 1996). As current dietary advice to those South Asians with diabetes and heart disease does not appear to be effective (McKeigue & Sevak, 1994), it may be postulated that amongst the more traditional Bangladeshi and Pakistani groups targeting traditional cooking practices may be a more effective measure to lower fat intakes than suggesting western alternatives (e.g. boiling, grilling, steaming instead of frying). Variation in fat and energy content of traditional dishes was also noted within and between groups. In many cases this was due to the amount of fat used in cooking, particularly with vegetarian dishes where fat content reflects added fat rather than any intrinsic fat as is present in meat dishes. During recipe collection the researcher (T.K.K.) noticed the common practice of 'pouring' oil into the pan rather than measuring it first. The amount of oil used in cooking could be reduced markedly by promoting spooning the oil into the pan. In addition, leaner cuts of lamb/mutton (generally

higher in fat) or preferably white meat (chicken was always cooked with skin removed) could be promoted. All groups, but particularly Ismailis, who were seen to eat more purchased traditional foods, need to be made aware of the high fat content items such as fried snacks (samosas, kebabs, pakoras, bhajias, ganthia) and sweets (mithai, thepla, shandesh, kheer, sevia).

Larger variations in fat content of recipes were found for Bangladeshi and Pakistani dishes. The availability of authentic lower fat recipes, presumably palatable to those consuming them, could therefore be used to decrease fat intakes in members of these communities. The Ismaili group appeared to be the most affluent and westernized of the three Muslim groups, eating a less traditional diet and more conscious of healthy eating messages. Overall, their recipes tended to be lower in fat. In contrast, the higher fat content of Bangladeshi recipes may not be surprising. They are the most recent arrivals in Britain from a poor rural setting (Sylhet). Although living in the least affluent area in East London, commodities such as cooking oil and meat are probably both desirable and more affordable after migration (Fieldhouse, 1995), which may

Table 8 Variation in fat content (g per 100 g of dish) of dishes common to two or more Muslim South Asian groups.

| Name of dish | Ismaili | Pakistani | Bengali |
|---------------------|---------|-----------|---------|
| Mixed veg curry | 8 | 4.8 | 13.9 |
| Spinach curry/bhaji | | 9.2 | 10.8 |
| Potato curry | | 8.5 | 5.7 |
| Masoor Dhal | | 6.3 | 2.8 |
| Kadhi | 3.1 | 12.7 | |
| Meat Pilau | 7 | 16.1 | 13.6 |
| Paratha | | 12.2 | 23.1 |
| Roti/Rotli/Chappati | 10.9 | 0.9 | 0.4 |
| Lamb Curry | 8.8 | 25.9 | 17.4 |
| Keema Curry | 13.7 | 26.8 | 29.1 |
| Chicken Curry | 5.2 | 15.7 | 10.5 |

| ANOVA: Single Factor Summary | | | | |
|------------------------------|-------|-------|---------|----------|
| Groups | Count | Sum | Average | Variance |
| Ismaili | 7 | 56.7 | 8.10 | 12.39 |
| Pakistani | 11 | 139.1 | 12.65 | 66.63 |
| Bengali | 10 | 127.3 | 12.73 | 78.69 |

| ANOVA Source of variation | | | | |
|---------------------------|---------|----|--------|---------|
| | SS | df | MS | P |
| Between groups | | 4 | 61.378 | 0.38556 |
| Within groups | | 77 | 58.281 | |
| Between groups | 110.44 | 2 | 55.21 | 0.3992 |
| Within groups | 1448.84 | 25 | 57.95 | |

explain their greater use. Lip *et al.* (1995) also found that the highest fat foods were purchased weekly by South Asian households of lower social classes (IV and V) which were also the classes of our Bangladeshi sample. Thus, variation in fat content of recipes may be a reflection of relative socio-economic and educational status, rather than differences between the three Muslim groups *per se* (Kassam-Khamis *et al.*, 1996)

Whilst a representative list of commonly consumed Pakistani dishes has been identified, further investigation is necessary to identify any differences in these dishes when prepared by Mirpuris which might influence nutrient composition. This could be done by comparing weighed recipes from Mirpuri households with the recipes obtained from our London sample.

Conclusions

Although epidemiological evidence does not suggest that South Asian diets explain the higher rates of CHD seen amongst these groups, there is a higher prevalence of central obesity and insulin resistance amongst South Asians than amongst Europeans. The most effective measure to control obesity is through reduction of fat and energy consumption. Current dietary advice to South Asians suffering CHD and NIDDM does not appear to be effective (McKeigue & Sevak, 1994). As traditional foods are still widely eaten by all generations in South Asian Muslim communities, strategies for fat and energy reduction which focus on traditional cooking practices and promotion of lower fat authentic versions of recipes for commonly consumed dishes may be more successful. This paper has described the traditional dishes commonly consumed by different South Asian Muslim groups and their nutrient composition. It is hoped that this information will be useful to dietitians and other health professionals working with members of these communities, to help assess diets and promote change. In addition, it should be of value to those involved with research into the links between diet and health in these populations.

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